

ADVERTISEMENT

OF A

PROPOSITION

FOR

WARD COMPANIES,

TO SUPPLY THE CITY OF NEW-YORK

WITH

ROCK WATER, &c.

BY

LEVI DISBROW & J. L. SULLIVAN.

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PROPOSITION.

THE Corporation, it is well known, has been anxious to supply the City with pure and wholesome water. It is therefore proper to premise, on this occasion, that the inventors of the mechanical means of deriving water from the primitive rock, and of distributing it in aqueducts of cheap construction, and well adapted to the cleansing of the streets, or of more immediate application to the exigencies of the summer time; having by law the privilege for a period, of rendering this service, feel it incumbent to offer this method to consideration; but are, at the same time, bound by respect towards the members of the Corporation to do so conditionally, that it do not interfere with the views of the municipal authorities in regard to bringing in the waters of the Bronx, should the right have been acquired of the institution that holds it. (See Appendix.)

But as the solicitude to undertake that work was manifested at a period earlier than the date of the latest experience in perforations, it is possible those views may have changed; or may be, after the facts contained in this publication may have been understood. In this event only can the countenance of the Corporation be expected to be given to the plan proposed of instituting *ward companies*.

The whole subject is therefore submitted for public opinion, requisite to sustain whatever is to be done in this improvement; and if the suggested plan should be acceptable, it will probably be expressed in petitions for leave to execute these works, in convenient divisions of the city.

JOHN L. SULLIVAN,
LEVI DISBROW.

NEW-YORK, July, 1832.

ADDRESS

TO THE INHABITANTS AND PROPRIETORS OF THE CITY OF NEW-YORK.

By J. L. Sullivan, Civil Engineer.

THIS Island is a part of that range of primitive rock, which extends along the coast of New-England, and from hence south-westward, marking the line of distinction, through the middle and southern states, between the upper and lower country. It is the rock over which all the rivers fall, in their course from the mountains to the Atlantic.

Between this dividing line or ridge of gneiss rock, and the Alleghany mountain of granite, the country is occupied by strata of secondary formation, and ridges and hills and vales of *diluvial origin*. This underground ridge of *gneiss*, thus extending nearly parallel to those high mountains, was the antediluvian coast of this continent. It has, like other ridges, its depressions and its elevations. Where this city stands, it is depressed, and the hollow is occupied by a *bed of sand*, not more than 100 feet deep, of loose texture, and incapable of preventing the percolation of foul water into the wells sunk in it. Such is the decided opinion of a committee of scientific men, appointed by the New-York Lyceum, last year, to answer an inquiry on this subject, made by one of the aldermen. They were very explicit, and expressed the opinion, that disorders were prevented from cure, and *dyspepsia*, that comprehensive name of all gastric derangements, *caused* by bad water.

It is true, that this respectable committee expressed an opinion *against relying on perforations for water*; but they were not informed of the main facts; had they been, perhaps they would have had very different impressions. This is the more to be regretted, as the subject is one in which the Lyceum might well have taken an influential lead. They appear not to have had an opportunity of investigation—not even of the perforations at the city hall, which they suppose to be in *rock*, when they are *only in earth*, and were ruined by excessive economy in substituting thin Philadelphia pipes for the substantial castings of Mr. Allaire, thus defeating the purpose of the *protective tube*, one of Mr. Disbrow's inventions.

The prejudice disseminated widely by the published letter of that respectable committee of the Lyceum, we meet, by simply showing, that if they

had examined the subject extensively, it would have been encouraging to the corporation, and they might have hailed this *new art of drawing water from the rock*, as propitious to the health and prosperity of the city, and as the only immediate means of supply. Perhaps, too, they would have found the geological circumstances in favour of confidence, even before experience had led the way. The error was, in thinking the strata of the primitive rock of this island *vertical*, when in fact they are inclined, and dip in the opposite direction to the primitive rock of the Alleghany mountain. It is said in Professor Silliman's lectures: "Geology is erected upon *facts*, and not upon mere speculation; and facts must never be contradicted by it." Let us then see what they warrant us to hope.

The evils which threaten this community, not only in the prevalence of the present epidemic, but accumulating with numbers, are too serious not to call forth generous efforts of philanthropy and enterprise commensurate to the occasion. The causes of predisposition to disease will cease, when foul water and bad air shall be got rid of.

The committee's analysis of the well water shows, that in bathing therein, it does not cleanse. Give the people pure water to drink, and they will not desire to mix spirits therewith. Spiritous liquors, all know, are unhealthy, because alcohol is composed of 12 parts carbon, 8 oxygen, 3 hydrogen, and is not digested, but absorbed.

It is found that the blood of a cholera patient is overcharged with carbon; and the heart and lungs consequently impeded.

Carbonic acid gas is generated in all the spontaneous changes to which dead animal and vegetable matters are subject: hence, the great importance of city cleanliness.

The proposition here contained, is addressed to those who have a deep interest, moral and social, in the consequences, whether of attention or of neglect of the means which a beneficent Providence has brought within their reach. To those who are the possessors of this commercial centre of the Union; the fairest of her cities; by nature the most healthy; the place of their birth or choice; the position of their industry and skill: to the men of business, of every denomination, this plan of permanent and early relief is respectfully submitted, as the most practical and economical.

My design is, 1st. Briefly to mention the instances of Mr. Disbrow's invariable success in deriving pure water from deep subterranean veins.

2d. Describe the geological characteristics of this locality, which justify the expectation of always finding it, at the depth of from 100 to 500 feet.

3d. The patented inventions that constitute our system of operation, possessed by no others, and therefore our duty to offer.

4th. To suggest a plan of carrying our improvements into operation, so as to make it profitable as well as effectual.

Machinery.

In the year 1824, Mr. Levi Disbrow, then residing in New-Brunswick, invented a powerful machine, for the purpose of perforating rock in search of water. It is perfectly accurate in its operation; and expeditious when a small steam engine is employed. This machine is the subject of his first patent, in 1825. The implements for enlargement, and overcoming every exigency, were the subjects of the second patent, in 1830, including the protecting tube, to defend the bore in operation in earth, and to bring up the pure water, unmingled with the surface or upper waters.

When the boring is in earth alone, the tube in successive joints is gradually forced down. When rock is perforated, a joint is made therewith.

Instances.

The 1st perforation was at New-Brunswick, for John H. Bostwick, Esq., on a high rocky hill, 250 feet, through slate and red sand stone; the water rose seven feet above the surface, one and half gallons a minute.

2d—at New-Brunswick, for Judge Simpson, 150 feet; overflowing.

3d—same vicinity, for Mrs. Griffith, 300 feet deep; overflowing moderately.

4th was at Somerville, for Governor Vroom, rising above the surface.

5th—at Princeton, on high ground, for Mr. Potter, from the bottom of a dry rock well, 100 feet, sand stone; rising five or six feet in the well.

6th—near Philadelphia, for Matthew Carey, Esq., from the bottom of a dry rock well, 40 feet deep, perforation 50 feet in gneiss; the water standing seven or eight feet deep.

7th—in Philadelphia, Northern Liberties, previous excavation in earth 40 feet, boring in gneiss rock 160 feet; the water rising and remaining 20 feet from the surface.

8th—near Baltimore, for Joseph Bosley, Esq., 200 feet in gneiss; the water rising nearly to the surface.

9th—at Harper's Ferry, for the United States, 200 feet, lower part gneiss; the water rising to near overflowing.

At Alexandria, 400 feet, without finding rock, and abandoned; showing how abrupt the primitive formation must be, as Potomac falls are only a few miles west of this city.

10th and 11th were at Perth Amboy, (in search of coal,) through clay, trap, red slate, 140 feet; both overflowing copiously.

12th—on Newark marsh, for Anthony Dey, Esq., two perforations, 100 feet deep, through sand, gravel, hard pan, clay and red sandstone; the water rising to near surface.

13th—on the marsh, for Samuel Swartwout, Esq., 80 feet deep.

14th “ “ Israel Foot, Esq., 80 feet deep, in sandstone; both overflowing.

15th—at Paulus Hook, for Messrs. J. & C. L. Strong, through gneiss, (principally,) 250 feet; water rising nearly to the surface.

16th—at Albany, for Boyd & M'Cauley, 300 feet, through black slate; mineral water.

17th—at Troy, through slate; good water.

18th—at Ballston, for Mr. Lummis, 100 feet, through black slate; overflow of mineral water.

19th—at same, for a company, 150 feet; same result.

20th—at Watertown, on Black River, for Mr. Bebe; producing a copious overflow.

21st—at Springfield, Massachusetts, for Thomas Blanchard, through red sandstone and slate; a copious overflow.

At Boston, about 30 perforations, } in earth and rock.
 Providence, 8 or 10 do. }

22d—on York Island, at Greenwich, for Guy Richards, Esq.

In earth, 68 ft.

gneiss, 134

—
 202 feet; water rising to within 20 feet of the surface of the ground, discharging 17 gallons a minute.

23d—at Greenwich, for Joshua Underwood,

20 feet in earth,

100 feet in gneiss rock, water rising to within 18 feet of the surface.

24th—at Greenwich, for John Hunt, } 4 feet excavation,
 } 65 " in gneiss.

25th—on the western summit, about 170 feet above tide, near the Deaf and Dumb Asylum, known as the Botanic Garden of William Shaw. Here the rock rises above ground, and shows its range and dip distinctly. Excavation of a well 20 feet; perforation from its bottom 92 feet; the water rising freely to within 18 feet of surface, or standing permanently two feet deep in the well, soft and pure. The bottom of the perforation is as high as the ground at the city tank.

26th—in Bleecker-street, near Broadway. Excavation first in earth down to the rock, 48 feet; perforation through strata of rock, 400 feet; producing a copious flow of soft pure water, rising to within 29 feet of the surface.

These are all the instances in rock attempted—all were successful; giving invariably very soft pure water.

With a knowledge of these facts, the Committee of the Lyceum could not have told the Common Council, "that perforations are *utterly useless*: that they may be carried to any imaginable depth in this rock, and when completed, will be merely reservoirs to receive the drainage from above."

Their mistake appears to me to have been in the supposition that the *primitive gneiss* of this island is in *vertical* strata. They say "The gneiss

of this island is nearly vertical or upright, and these are so closely united as to be barely visible to the eye. It is not then from these crevices or partings that we are to expect a supply of water."

It may be said, in reply to this, that it is surely not from these *superficial partings* that we are to expect water, but from much enlarged partings or spaces, deep in the earth. The strata are seen to be inclined, at about 60 degrees, when by quarrying they are laid open. The line of dip is between west and north-west.

Now what are the reasons for thinking that the dip of the strata are less and less steep as they descend into the earth, and the "partings" more open?

This is probable, because as the committee say, (page 3,) the rock is softened by being in contact with water for a long time. And this is proved by the progress of the drill, which proceeds faster as it approaches a parting, as three to one, and slower as it recedes; and if thus softened, and the water is *flowing*, it must *wear the spaces wider*. That it must flow, is evident, because no *parting* can be so close as to prevent its flow and escape, if the source is high. We often see water issuing from the seams of rock *That they have been worn away, is evident, from the fact that the drill often drops or falls perceptibly between strata.*

The lowest strata in the Bleeker-street perforation, were found to be 9 f. 8 f. 13 f. 9 f. 14 f. 16 f. 11 f. thick obliquely.

Water was found at 362 feet, and at each successive space or parting; but not enough till that at 442 feet was reached. The drill went five feet farther without reaching another.

Here, then, we have evidence of the existence of regular strata rising one over the other, and extending farther and farther *eastward* under each other, forming the eastern slope of the ridge; and this is the cause of the good water found on the east side the town, by boring down to this sloping rock, water issuing from between the strata.

At the Dry Dock, the perforation was 100 feet. At Mr. Fickett's, 102 feet. And several others, also in earth, on the eastern side of the town. On the west, several also with like result, the water being better than that of the wells. At Washington Market, 72 feet. At Wooster and Grand, 50 feet. At Cram's Distillery, 72 feet. But in such a soil, it may not be reasonable to expect, that, even at this depth, with a dense population, the water will long remain uncontaminated, especially with open pavements, permitting foul water to soak in. Cemented streets are better.

Such being the circumstances, we turn with some confidence to facts which the science of geology offers, to sustain the *rationality of always expecting to find water in the spaces of the strata of gneiss.*

This variety of the primitive rock, coeval with granite, the earliest product of crystallization from the primordial ocean, according to geolo-

gists, evidently, like the others, took a stratified form from the beginning. Whether or not stratified was a disputed point for a long time. Saussure changed his opinion, on seeing *les Aiguilles* from the summit of Mont Blanc. Playfair and Humboldt were convinced of their *universality*. And Hutton accounts for them, by supposing the partings caused by shrinkage of the mass. They were, however, once horizontal, and for a long time so, as the rocks of *secondary formation*, soft slate, transition rock, limestone and sandstone, alternate, and stand leaning against the vertical strata of the granite Needles of the Alps, just mentioned, which rise perpendicularly several thousand feet, appearing to have been *upraised* by some mighty agency, forcing their way through the secondary strata.

Professor Silliman says, that "secondary rocks are usually horizontal, or not many degrees from that position; but when they *touch primitive mountains*, they *generally slope down their flanks*, always lying above them, but declining gradually towards the plain countries, and terminating commonly beneath them."

They *appear* to terminate beneath them, because the plains and the diluvial hills, like the Catskill, and most others in our country, are the deposits or accumulations of rock and earth, thrown together by the violence of the waters of the general deluge.

There is, indeed, no place where water is not found on digging, because rain falling on all, soaks in, more especially into high lands, where the clouds are most attracted and condensed. These small superficial waters, which break out in springs, and form brooks and streams, explain those deeper operations of nature, on which we must *here rely*.

If the primitive rock is in strata, those of the Alleghany mountain must connect with the gneiss ridge of the *original coast*, and the pure waters of the clouds entering their spaces, must act, press and move, with a force proportioned to that of gravity, the universal law, and flow in these deep channels in proportion strong and rapid, if vented at considerably lower points than their source.

The same author remarks, that strata of primitive rock in a given situation, many miles below the surface, may, and necessarily must, come into view at some place or another; and if the soil or diluvium were completely removed, they would appear probably for many leagues; it might be even for hundreds of miles beneath the surface, (or to this effect.)

Therefore, when a primitive rock comes in view, or *crops out*, its line of dip is considered as indicating, with perfect certainty, its course, *at least until it meets with primitive rock dipping in the opposite direction*. And the same learned author intimates, that there is such a connexion between the granite of the Alleghany and the *Rocky Mountains*, as the intermediate space is all of secondary formation, exhibiting the largest surface of derivative rock on the globe.

From observation, I believe the Alleghany strata slope also eastward, covered by secondary, and these by diluvial deposits, and must, at some depth, meet the gneiss strata; and blend being nearly the same.

And if we may imagine all the earth removed from between this *gneiss range* and the granite range of Alleghany, it would exhibit a basin of rock, layer on layer, with the western side about 2000 feet the highest.

Bakewell says, "In the formation of North America, it is much more common to find primitive rocks at low levels, and at moderate angles of elevation, than in Europe."

We have now before us intelligibly the explanation of these subterraneous rock waters, intercepted in their flow to the ocean by this *gneiss barrier*, which appears at the lower falls of all our principal rivers, having their sources in the Alleghany mountains, and flowing eastward. I call it a barrier, because the water rises above tide in the partings, after passing under the Hudson.

Without pretending to the minutiae of geology, it is sufficient for my purpose, to show that there exists no inconsistency with that science in this supposition, but rather that the facts tend strongly to prove it; and to distinguish these waters from those of the secondary rock, and the tertiary, and the diluvial hills.

The waters in the perforations on these have a different source. It is sufficient to account for them, to recollect the high and well watered country which lies between the Hudson and the Delaware—at Passaic Falls, 112 feet, and at Brookland pond, on the dividing ridge, 800 feet above tide.

If, then, *philosophy sustains experience*, may we not yet hope that the Lyceum will, on a review of the facts, sustain and encourage confidence in this system?

Indeed, the excavation of the great well for the city tank, is a further testimonial. It is carried down 100 feet, 16 feet diameter, and has two horizontal shafts of 50 feet, 4 feet square; (out of which shafts alone, rock enough was taken to equal a boring of 3,700 feet.) At this moderate depth it yields 8,000 gallons a day, as I compute it. But the Bleecker-street perforation of 442 feet, yields 44,000 gallons a day, and is capable of yielding much more, (or such are,) with our improvements.

The Mechanical Means.

The inventions of Mr. Disbrow, for perforating the rock, and bringing up the water pure, as high as it will rise, was the subject of his two first patents. The third comprehends a principle of which we are joint inventors. An improvement, relating to the means of obtaining the greatest quantity of water that can be derived from any one perforation. The quantity that will flow through the lower orifice will, if no impediment to its approach exists, be found to be that due to the hydrostatic pressure, or head of water existing, known by the height at which it stands

in the perforation. This quantity being calculated on known principles, the power to lift the column of water as rapidly, is also calculable. By placing the chamber and lifting box in the lower tube, with our relief boxes at various heights along the spear, there may be drawn by a steam engine *as much water as will flow into the lower end of the tube.* The means of this operation is in the third patent. The fourth is a new form of city aqueduct, for the less expensive and more prompt distribution of the water, described as follows :

This kind of aqueduct is intended not to interfere with the Manhattan pipes, as well as to serve several new purposes in the summer months.

It is much the least costly way of supplying the city with good water, and perhaps at present the only one. It may, in an exigency, too, be quickly and very generally done cheaply, so as to last many years.

In the ensuing proposition, we make our emolument as patentees, *secondary* to a reasonable revenue to the stockholders. Let the city be divided into as many watering companies as there are wards. *Let the price of the water be fixed at moderate rates per house,* payable by the owner, who will, of course, receive it, if he thinks proper, of the tenant. Let it be entirely optional to take it or not. Let those who take it, have a portable key. Let the public institutions have the water free, and the use of it to extinguish fires at the command of the chief engineer. Let there be a mode of connecting the whole so that it may occasionally be opened, lest the engines or pumps of one ward should be accidentally out of order; and so that the water of all may flow towards the place where a fire may occur.

One deep and well-managed perforation may be sufficient for each ward, except for baths, breweries, sugar-houses, and manufactories, which the patentees reserve for special contracts.

Several of the perforations already made, might be improved, if acquired by companies.

The terms proposed are, that the mechanic work and personal services be paid for as usual. That when the net income is more than seven per cent., the patentees jointly shall receive half the surplus revenue over that dividend; the other half going additionally to the stockholders. Thus, if the net revenue be ten per cent., the stockholders get eight and a half, and the patentees one and a half per cent. on the capital invested. These terms to continue during the fourteen years of the patent, the stockholders then to have the whole in perpetuity. Each ward company to be incorporated. The city government may hold stock in each.

By this plan, it is evident that the most complete supply will be the most profitable. Motives are given for the earliest possible execution of the work; and its supply to the city generally, at the same time, removes all the difficulties that arise from a great corporate undertaking. No public debt is created, no taxes for interest on funds borrowed, but private capital is called into action on proper terms, and for an object that at once

interests the owners of real estate, and opens an opportunity of a good and permanent investment to capitalists, whether interested in the real estate or not.

Such is our plan. Knowing of no better one at present, and believing it likely to be acceptable, we propose that it should be tested by public opinion, and take this method to make it known, as a subject of consideration. If approbated, it wants only the sanction of the corporation, which must, I presume, depend on the wishes of the community. Perhaps it is a subject worthy the attention of benevolent societies.

An exigency exists, that has added, and may permanently add great motives to those before existing.

This city *has* suffered with the yellow fever; the predisposing causes must be subdued, lest this and the epidemic recur periodically. Physicians have told you it is in the *nature of the soil*, and reason tells us it is also neglect. It is in vain to inculcate *temperance* and *cleanliness*, when the water is unpalatable, and itself unclean. The great body of the inhabitants cannot fly the danger—they must abide the event, protect their property and their families, and the property, too, of those who are absent. Can the wealthy do better than to adopt a general plan of works, which relate not alone to safety, but to permanent prosperity and happiness. Can the benevolent do better, than to promote, practically, what they know will give efficiency to the virtues they inculcate? The earliest, noblest, and most needful works of commercial cities have been aqueducts.

There are, besides, great general considerations, deeply affecting the value of property in this city. The neglect of the means of healthfulness will throw business into other ports. The admirable natural advantages of New-York may be outdone by art;—Philadelphia is straining every nerve to concentrate thither the western trade.

The western trade is the aliment of our foreign commerce. Already, though recently, the Blanchard steam-boat has made the Alleghany a navigable stream as far as Hamilton, the future eastern head of the western waters—the immediate and cheapest route to the Valley of the Ohio and Mississippi. At this point, the New-York and Erie rail road must touch. Every prospect and means of commercial aggrandizement adds value to the natural advantages of our city, and gives consequence to the means of rendering it the healthful abode and resort of opulence, and the seat of the arts. No place has a better surface for drainage, or is better situated for free ventilation. It is simply *the soil* that is to be considered defective; but beneath it we have our foundation on the rock.

It seems to me, that every citizen, especially the young and enterprising, who are looking forward with hope, must contemplate the advantages of this place of his birth or choice, with exultation and honest pride, and feeling the glow of public spirit, take resolution to do all in

their power to secure and defend them. There must be *union of purpose* and great perseverance to command success. It is in these respects only that Philadelphia excels New-York.

The protection of the mechanic interest ought ever to be a primary object in a commercial place; and it is to be hoped that when the present dispensation shall have passed over, the recollection of it will be a powerful inducement to guard as much as possible against its recurrence, and against the severe distresses of suspended business—the consequence as much of the predisposing condition of the city as of the epidemic.

The wealthy are not unwilling to pay whatever is requisite. It is thirty-three years since pure water was promised. Is it not time for the people to resume, and to assert their right of providing for themselves this article of prime necessity? Is it not false economy to postpone what ought to have been already done?

It has been proved that New-York might, at less cost, be a much better supplied city than Philadelphia, with her boasted Schuylkill.

Modes of carrying this plan of supply into effect.

There are two modes by which the rock water may be distributed. 1st. By means of a main pipe, laid two feet under the pavement, with branches to the edge of the side walks rising in hydrant posts, as at Philadelphia. The nearness and elevation of the reservoir will here be such as to permit of a less diameter of pipe than where all the water comes through one or two, and the aqueduct be less costly than usual.

The other mode is an elevated aqueduct. The columns, high enough to cross the streets above the travel, may be substitutes for the awning posts. The pipes being covered in, the whole will present the aspect of an architectural colonnade.

In winter, the only defence necessary, will be to empty them at night into the fire cisterns, if such should be made; or to stop supplying after six o'clock, each family previously filling a water cask for the evening's use.

The *elevated aqueduct* is recommended by the circumstance of its not disturbing the pavement for repairs, always accessible, and capable of being ornamental. A colonnade, surmounted with a cornice, containing the pipe, may have vines trained up the posts, and along it, mingling their foliage with the trees, and be a pleasing relief to the eye from the windows of houses. Plainer colonnades might occupy the interior of squares.

In the more busy parts of the city, where the streets are narrow, the *underground pipes* will be preferable. From either, the water may be carried into the kitchen and bathing rooms, as well as be delivered at the door for purposes of public cleanliness. In some places, three hydrants on the front of a square will be sufficient.

An estimate requires accurate data ; but for the present, it will suffice, for example, to say, that a ward of the extent of the third, contains about 24,000 feet of street, and if all charges were three dollars a foot, including the cross pipes, it would not exceed 100,000 dollars. We may say, then, that the amount of capital for each ward, will be between one hundred and two hundred thousand dollars, if, as we suppose, there are fifteen hundred houses in each ward that will take the water at ten dollars a year, this would pay the charges, and an ample revenue. Each owner of an estate being a party interested in the good operation of the work, and each being of a moderate extent, it will be a very manageable property.

The steam engines properly constructed, will not throw out any smoke, nor make any noise. The persons in charge of them may always be mechanics, having some occasion for a little moving power, when not all required, and this privilege be equivalent to the care.

No doubt very cheap elevated aqueducts might be temporarily made in wood ; but we are speaking of a permanent work and property.

Some misconception of the expense of perforation having prevailed, it is proper to state here the terms which the *experience* of Mr. Disbrow enables him to offer.

Beginning at the surface of the ground. The perforation in earth only, placing therein an 8 inch tube, the first 100 feet, \$7 a foot.

10 "	"	10 "
12 "	"	15 "
Rock boring, 2 1-2 inch perforation, for the 1st 100 ft. \$7 a foot, \$700		
do.	do.	2d " 10 " 1000
do.	do.	3d " 15 " 1500
do.	do.	4th " 20 " 2000
		<hr/> \$5200

To enlarge a 2 1-2 inch bore, and make it 8 inches in diameter :

The 1st 100 feet, \$700		
2d	"	1000
3d	"	1500
4th	"	2000
		<hr/> 5200
		<hr/> \$10,400

10,400 dollars for a perforation, 8 inches in diameter, 400 feet in the rock.

This is, no doubt, less than the boring and well at Bleecker-street cost. Before Mr. Disbrow's services were engaged here, some artisan was employed, who used the common instruments. These broke in the hole, and could not be extricated, and it was necessary to begin anew.

His first contract (as he informs me) was to bore

200 feet, for	-	-	\$1000	} 2 1-2 inch perforation.
100 " more for	-	-	1000	
100 " more for	-	-	1500	

3500

to enlarge it to 7 inches, 200 ft. 2000

to enlarge 200 feet more, 4250

9750

Contract for a new curb to the well, 600

\$10,350

The engine employed to raise 44,000 gallons of water in twenty-four hours, is six horse power, and uses about three quarters of a ton of coal in that time, and may have cost two thousand dollars.

TO THE INHABITANTS OF PHILADELPHIA AND OTHER CITIES.

Although a precedence is given to this essential work in New-York, this publication may also interest you; as it contains an explanation of the *geological circumstances*, that show the probability of *always* finding soft pure water in the primitive rock, as in some few instances more south, already mentioned.

Although the Northern and Southern Liberties of Philadelphia do partake in the Schuylkill works, it may be desirable to them, as indeed it may be to other parts of the city, to have rock water to drink. At Baltimore, the long descending streets would be favourable to aqueducts; at Washington, the *Pennsylvania avenue* might be easily supplied. At Richmond, one perforation in the primitive rock would supply all the town. At Charleston, they have long desired a supply from the country; New-Orleans uses the river water—it is soft and pure, but turbid. A few deep perforations might give that city an excellent supply; and the dust, often very annoying there, might be kept down by the general distribution of water in elevated aqueducts.

113 BLEECKER-STREET,
New-York, July, 1832.

APPENDIX.

THE language used in the act of incorporation of the Manhattan Company, is here given, to show that no interference with their exclusive right is possible :

“Sec. 5th. *Be it further enacted*, That it shall be lawful for the said company to enter into and upon, and freely to make use of any land which they shall deem necessary, for the purpose of *conducting* a plentiful supply of pure and wholesome water to the said city ; and to erect any dam or other works across or upon any stream or streams of water, river or rivers, or any other place or places where they shall judge proper, for the purpose of raising such *stream or streams*, or turning the course thereof, or of making use of such *streams, rivers*, or places for constructing or working any necessary engines ; and to construct, dig, or cause to be opened, any canals or branches whatsoever, *for the conducting of such stream or streams*, or any other quantity of water, from any source or sources, that they may see fit ; and to raise and construct such dikes, mounds, or reservoirs, as they may judge proper, for securing and conveying such supply of water *as aforesaid* to the said city ; and to survey and lay out all such lands and *streams* as they may think proper, in order to ascertain the best mode of furnishing such supply, and the best and most productive *streams* and sources or fountains of water, for that purpose ; and to lay and conduct any number of pipes, conduits, or aqueducts, through or over any of the said lands, or any rivers or streams, of water, as they may see fit, *to or towards the said city*, and in any and every part of the said city ; and to agree with the owner or owners of any mills, lands, tenements, or hereditaments, that may be damaged or affected by any of the said operations, for and about a reasonable compensation, to be made to him, her, or them, for such mills, lands, tenements, or hereditaments, or the use thereof, as may be used or occupied for the purposes aforesaid, or any of them, or for any damage which he, she, or they, or any of them, may sustain by the employing, diverting, or obstructing any *such stream or streams*, or using any such lands, or the cutting, laying, raising, or making any such reservoirs, aqueducts, canals, trenches, pipes, conduits, dikes, or mounds aforesaid ; and in case of disagreement,” &c.

The sixth section relates, in usual manner, to right of entry and use.

The seventh section gives the President and Directors power to make by-laws. And they “may also agree with the corporation of the city of New-York, the inhabitants of the said city, and others, choosing to take or use the said water, regarding the rates at which the same shall be paid for ; *Provided* that the said company shall, *within ten years from the passing of this act*, furnish and continue a supply of pure and wholesome water, sufficient for the use of all such citizens dwelling in the said city, as shall agree to take it on at the terms to be demanded by the said company ; in default whereof the said company shall be dissolved.

It is a remarkable proof of the purity of the rock water, and freedom from all acids, like those mentioned in the analysis of the well water, that when iron pumps are used, the water is not corroded or oxydized, but continues limpid and soft.

From Guy Richards, Esq.

I certify that Mr. Disbrow sunk a shaft, during the last summer, at my establishment at Greenwich, called the Eagle Mills, to the depth of about 204 feet—sixty-eight feet of it through sand and gravel, and the remainder in the rock, 2½ inch bore. The pump has been in constant operation more than three months, (Sundays excepted,) and has delivered about 22,000 gallons per day. Yesterday, the stroke of the pump was lengthened, and after fifteen hours trial, the quantity pumped for an hour was measured, and found to be at the rate of 26,000 gallons in twenty-four hours. It is nearly as soft as rain water, and leaves no scale on the boilers; but, on the contrary, has taken off that which had been formed from the water previously used, and left them entirely clear.

The pump and water can be examined at the Mills, corner of Greenwich-lane and Perry-street.

GUY RICHARDS.

New-York, April 10, 1832.

MANHATTAN ISLAND, *New-York, April 9, 1832.*

We certify, that we have obtained water, for our domestic purposes, from a well at the corner of Avenue D. and Fifth-street, bored and sunk by Mr. L. Disbrow, and that we approve of the water, as being pure, both good for drink and washing, and, as we believe, the best and cheapest that can be had by any other means, on the Meadows.

(Signed)

SAMUEL FICKETT,
GARDNER FICKETT,
CHARLES CURTISS,
FRANCIS FICKETT,
JOHN THOMES.

A similar certificate was also obtained from Jeremiah Dodge and others, near the corner of Columbia and Rivington streets.

New-York, April, 1832.

We, the undersigned, living in the vicinity of Washington market, certify, that we had experienced great inconvenience on account of the qualities of the water, drawn either from wells or the Manhattan Water Works, till Mr. L. Disbrow sunk the well in said market, and that we now obtain ample supplies of good water from that pump.

(Signed) VAN ORDEN & VAN BRUNT,
ISAAC F. CONCKLIN & Co.
H. I. SWAIN,
THOS. BARTINE,
WILLIAM ALLISON,
GREEN & WETMORE,

HENRY D. D. WALD,
JAMES ANNETT,
LEONARD BAUM,
R. BUNN,
WILLIAM HARRISON,
JOHN B. EBBETS.

I certify, that, carrying on an extensive business in washing clothing for the inhabitants of the city, I found great difficulty in procuring water for washing. I employed Mr. L. Disbrow to bore for water, and have obtained a large supply of good soft water, from which I supply a large manufacturing establishment, besides selling large quantities through the city for drink and other purposes, in addition to what I want for washing.

(Signed)

JOSHUA UNDERWOOD.

Practical Suggestions from the preceding pages.

As the Asiatic epidemic is now ascertained to occur wherever uncleanliness and intemperance combine to poison the air, the water and the blood, winter and summer, the remedy, for the present and the future, is in our power, and obvious.

If the Manhattan Company has not been able to effect what it was instituted by law to do, it has done a valuable service to the city, in demonstrating, by a deep perforation on Broadway, near Bleecker-street, the practicability of drawing water from the subterraneous rock, in sufficient quantities for cooking, drinking, and washing.

What this company cannot, perhaps, according to the letter of its charter, do, they may allow the Corporation to do, had it funds; or, an association of the benevolent and public spirited. They may be willing to sell this property, as being in readiness, and to them useless.

Let a company be formed, to comprehend the 4th, 6th, 8th, 9th and 14th wards, as these comprehend the most populous and lowest ground of the city. Let the Corporation only consent, and it will be done. Let a *temporary aqueduct* be made throughout this whole extent from this source of supply, which may yield, at least, 144,000 gallons in twenty-four hours, now yielding, with an engine much below the proportion suitable to the perforation, a third as much.

Let the system thus commenced, be carried on till completed; and as many perforations made as may be necessary. Let it not depend on the purchase of the Manhattan Company, however desirable in point of time. Theirs will not alone be sufficient; perforations should be made on Chat-ham-square, and on the Park, and on or near St. John's-square.

Let other wards also form companies; let meetings to appoint committees to open books be held, and purchase (if they will sell) whatever would be available of the Manhattan works, that may not be reserved for use, when ready at some future time, to bring in the rivers and streams of Chester.

Let the perforations already made be more availed of to supply their neighbourhood. Let manufacturing establishments requiring much good water, supply their surplus to the squares in which they are situate, if so agreed.

Let there be a law to inspect and condemn old houses, unfit for habitation. Let the *Five Points* be converted to a square, as no nuisance can be safely permitted in future that public vigilance and regulations can prevent.

See the Museum
of

22. 18. 18. 18.

Per Doc. **PAID** Milnor J

S2 Beckman